PROPOSED SYNOPSIS FOR Ph. D. WORK
DEPARTMENT OF ZOOLOGY, VKS UNIVERSITY, ARRAH

VARIATIONS IN HEPATIC ENZYMES, HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS IN *CHANNA PUNCTATUS* (BLOCH, 1793) EXPOSED TO HEXACONAZOLE TOXICITY

INTRODUCTION

Paddy and fish are one of the most important staple foods for most people in Asia, where food scarcity is a major issue. Through ecological agriculture, paddy-fish farming is one of the best options for increasing food production from limited land (De la Cruz et al, 1994; Jintong et al, 1996).

Pesticide/fungicide pollution is the most serious environmental issue in paddy-growing areas because pesticides in paddy fields easily enter the open environment and can contaminate resources like groundwater and surface water (Mohammadian et al, 2015).

The most important paddy (*Oryza sativa* L.) disease (Rush and Lee, 1992; Groth and Lee, 2003) is sheath blight caused by *Rhizoctonia solani* Kühn (Gangopadhyay and Chakrabarti, 1982; Ou, 1985). It is distinguished by large oval spots on the stem leaf sheaths and irregular spots on the leaf blades

Trizole fungicides are used to control sheath blight, grain discoloration, and other foliar diseases in paddy. Difenconazole, Dimoxystrobin, Flutolanil, Isotianil, Hexaconazole, Orysastrobin, Hropiconazole, Prothioconazole, Pyraclostrobin, Tebuconazole, Tricyclazole, and other fungicides are commonly used. Kannaiyan and Prasad (1976) attempted fungicidal control of sheath blight in India. Farmers have consistently used Hexaconazole fungicide to control Sheath blight disease.

Several studies have revealed that many new fungicides for managing sheath blight in rice have been identified, with efficacy varying depending on location and time of application (Wandscheer et al, 2017). The application of the appropriate chemical (Hexaconazole 5SC) at the appropriate time (maximum tillering stage) was critical in the control of sheath blight (Swamy et al, 2009).

Hexaconazole (Conazole, Imidazole) (molecular formula: $C_{14}H_{17}Cl_2N_3O$) (Systematic IUPAC name: 2-(2,4-dichlorophenyl)-1-(1H-1,2,4-triazol-1-yl)hexan-2-ol): It is a tertiary alcohol that functions as a chelator. Contaf Plus, Hexacis Super, Hexadhan Plus, Hexanob, Hexarin Plus, Hexazole Plus, Hexer, Katyayani, Kinki, Sitara, Syngenta Amitsar, Taqat, and Trigger are some of its brand names. It is a broad-spectrum systemic triazole fungicide that has strong antisporulant and translaminar activity. It keeps the plant green, increasing crop yield and profit for the farmer. It is effective against seed-borne and soil-borne diseases caused by Ascomycetes, Basidiomycetes and Deuteromycetes. It may non-toxic fungicide to mammals, birds, some fishes and natural enemies. According to Boran et al. (2012), Hexaconazole is highly toxic to fish and aquatic species, killing 50% of rainbow trout in 24 and 96 hours respectively at concentrations of 0.57 and 0.38 mg/L. The majority of its consumption occurs in Asian countries, where it is primarily used to control rice sheath blight in China, India, Vietnam and other parts of East Asia.

The European Union receives the most aromatic basmati rice, PB1 and 1401. So far, shipments of these varieties with a Trizole maximum residue limit (MRL) of 0.03 mg/kg have been accepted from India. The European Commission recently reduced the MRL for Trizole in basmati rice to 0.01 mg/kg beginning next year (The Economic Times, 2017; Jaspal Man, April 11, 2018).

EXPERIMENTAL DESIGN

The work will be divided into four sections:

1. Determination LC_{50} dose of Hexaconazole.
2. Hepatic anomalies are evaluated by measuring alkaline phosphatase (ALP) and alanine transaminase (ALT).
3. Absolute and relative indices of erythrocytes and leucocytes will be determined to evaluate haematological anomalies.
4. Biochemical abnormalities such as total protein, blood glucose, blood cholesterol, and blood urea are evaluated.

METHODOLOGY

Live *Channa punctatus* specimens will be collected from nearby paddy fields/fisherman, and the most popular brand of Hexaconazole will be purchased from the Arrah local market. The work will be carried out using the APHA (2022) standard method and the Finney (1971) probit analysis method. Neubauer's haemocytometer will be used for TC/WBC counting. The method of Reitman and Frankel (1957) will be used to estimate hepatic enzymes. Other biochemical parameters will be investigated using standard methods. Graph Pad Prism 9.5.1 software will be used to perform statistical analysis on the data.

SIGNIFICANCE OF THE WORK

The findings could be used as biomarkers for Hexaconazole and other pesticides. The findings will help to develop methodology for testing the hazardous effects of pesticides on fish. Farmers should promote the prudent use of fungicides. To reduce the toxic effect of fungicides, the use of biopesticides and natural products should be encouraged.

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